



SEQUENCE LISTING

<110> Bron, Sierd
Jongbloed, Jan D.H.
Mueller, Joerg P.
Van Dijl, Jan M.

<120> Twin-Arginine Translocation in Bacillus

<130> GC634-2

<140> US 09/954,737

<141> 2001-09-17

<150> US 60/233,610

<151> 2000-09-18

<160> 86

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<212> PRT

<213> Escherichia coli

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Gly	Ala	Ser	Ile	Lys	Gly	Phe	Lys	Lys	Ala	Met	Ser	Asp	Asp	Glu	Pro
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Lys	Gln	Asp	Lys	Thr	Ser	Gln	Asp	Ala	Asp	Phe	Thr	Ala	Lys	Thr	Ile
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Ala	Asp	Lys	Gln	Ala	Asp	Thr	Asn	Gln	Glu	Gln	Ala	Lys	Thr	Glu	Asp
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<212> PRT

<213> Escherichia coli

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Val	Leu	Leu	Phe	Gly	Thr	Lys	Lys	Leu	Arg	Thr	Leu	Gly	Gly	Asp	Leu
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Gly	Ala	Ala	Ile	Lys	Gly	Phe	Lys	Lys	Ala	Met	Asn	Asp	Asp	Asp	Ala
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<213> *Bacillus subtilis*

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Asp Thr Leu Arg Glu Phe Lys Asn Ala Thr Lys Gly Leu Thr Ser Asp
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<213> *Bacillus subtilis*

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      20           25           30
Ala Lys Arg Thr Leu Leu Glu Phe Lys Ser Ala Thr Lys Ser Leu Val
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Ser Gly Asp Glu Lys Glu Glu Lys Ser Ala Glu Leu Thr Ala Val Lys
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Gln Asp Lys Asn Ala Gly
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<213> *Bacillus subtilis*

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Leu Val Phe Gly Pro Asp Lys Leu Pro Ala Leu Gly Arg Ala Ala Gly
      20           25           30
Lys Ala Leu Ser Glu Phe Lys Gln Ala Thr Ser Gly Leu Thr Gln Asp
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<213> *Escherichia coli*

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Ala	Gly	Trp	Ile	Arg	Ala	Leu	Arg	Ser	Leu	Ala	Thr	Thr	Val	Gln	Asn
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Glu	Leu	Thr	Gln	Glu	Leu	Lys	Leu	Gln	Glu	Phe	Gln	Asp	Ser	Leu	Lys
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Lys	Val	Glu	Lys	Ala	Ser	Leu	Thr	Asn	Leu	Thr	Pro	Glu	Leu	Lys	Ala
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Ser	Met	Asp	Glu	Leu	Arg	Gln	Ala	Ala	Glu	Ser	Met	Lys	Arg	Ser	Tyr
			85						90					95	
Val	Ala	Asn	Asp	Pro	Glu	Lys	Ala	Ser	Asp	Glu	Ala	His	Thr	Ile	His
			100						105				110		
Asn	Pro	Val	Val	Lys	Asp	Asn	Glu	Ala	Ala	His	Glu	Gly	Val	Thr	Pro
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<212> PRT

<213> Escherichia coli

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Cys	Leu	Val	Tyr	Phe	Ala	Asn	Asp	Ile	Tyr	His	Leu	Val	Ser	Ala	Pro
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Leu	Ile	Lys	Gln	Leu	Pro	Gln	Gly	Ser	Thr	Met	Ile	Ala	Thr	Asp	Val
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Ala	Ser	Pro	Phe	Phe	Thr	Pro	Ile	Lys	Leu	Thr	Phe	Met	Val	Ser	Leu
65					70					75					80
Ile	Leu	Ser	Ala	Pro	Val	Ile	Leu	Tyr	Gln	Val	Trp	Ala	Phe	Ile	Ala
			85						90					95	
Pro	Ala	Leu	Tyr	Lys	His	Glu	Arg	Arg	Leu	Val	Val	Pro	Leu	Leu	Val
			100					105					110		
Ser	Ser	Ser	Leu	Leu	Phe	Tyr	Ile	Gly	Met	Ala	Phe	Ala	Tyr	Phe	Val
	115						120					125			
Val	Phe	Pro	Leu	Ala	Phe	Gly	Phe	Leu	Ala	Asn	Thr	Ala	Pro	Glu	Gly
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Val	Gln	Val	Ser	Thr	Asp	Ile	Ala	Ser	Tyr	Leu	Ser	Phe	Val	Met	Ala
145					150					155					160
Leu	Phe	Met	Ala	Phe	Gly	Val	Ser	Phe	Glu	Val	Pro	Val	Ala	Ile	Val
			165						170					175	
Leu	Leu	Cys	Trp	Met	Gly	Ile	Thr	Ser	Pro	Glu	Asp	Leu	Arg	Lys	Lys
		180						185					190		
Arg	Pro	Tyr	Val	Leu	Val	Gly	Ala	Phe	Val	Val	Gly	Met	Leu	Leu	Thr
	195						200					205			
Pro	Pro	Asp	Val	Phe	Ser	Gln	Thr	Leu	Leu	Ala	Ile	Pro	Met	Tyr	Cys
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Leu	Phe	Glu	Ile	Gly	Val	Phe	Phe	Ser	Arg	Phe	Tyr	Val	Gly	Lys	Gly
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Arg Asn Arg Glu Glu Glu Asn Asp Ala Glu Ala Glu Ser Glu Lys Thr
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Glu Glu

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<212> PRT

<213> Bacillus subtilis

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 20 25 30
 Phe Ile Ala Gly Phe Phe Leu Ala Lys Pro Ile Ile Val Tyr Leu Gln
 35 40 45
 Glu Thr Asp Glu Ala Lys Gln Leu Thr Leu Asn Ala Phe Asn Leu Thr
 50 55 60
 Asp Pro Leu Tyr Val Phe Met Gln Phe Ala Phe Ile Ile Gly Ile Val
 65 70 75 80
 Leu Thr Ser Pro Val Ile Leu Tyr Gln Leu Trp Ala Phe Val Ser Pro
 85 90 95
 Gly Leu Tyr Glu Lys Glu Arg Lys Val Thr Leu Ser Tyr Ile Pro Val
 100 105 110
 Ser Ile Leu Leu Phe Leu Ala Gly Leu Ser Phe Ser Tyr Tyr Ile Leu
 115 120 125
 Phe Pro Phe Val Val Asp Phe Met Lys Arg Ile Ser Gln Asp Leu Asn
 130 135 140
 Val Asn Gln Val Ile Gly Ile Asn Glu Tyr Phe His Phe Leu Leu Gln
 145 150 155 160
 Leu Thr Ile Pro Phe Gly Leu Leu Phe Gln Met Pro Val Ile Leu Met
 165 170 175
 Phe Leu Thr Arg Leu Gly Ile Val Thr Pro Met Phe Leu Ala Lys Ile
 180 185 190
 Arg Lys Tyr Ala Tyr Phe Thr Leu Leu Val Ile Ala Ala Leu Ile Thr
 195 200 205
 Pro Pro Glu Leu Leu Ser His Met Met Val Thr Val Pro Leu Leu Ile
 210 215 220
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 245 250

<210> 9

<211> 245

<212> PRT

<213> Bacillus subtilis

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 20 25 30
 Ala Phe Leu Phe Val Gln Asp Ile Tyr Asp Trp Leu Ile Arg Asp Leu
 35 40 45
 Asp Gly Lys Leu Ala Val Leu Gly Pro Ser Glu Ile Leu Trp Val Tyr
 50 55 60

Met Met Leu Ser Gly Ile Cys Ala Ile Ala Ala Ser Ile Pro Val Ala
65 70 75 80
Ala Tyr Gln Leu Trp Arg Phe Val Ala Pro Ala Leu Thr Lys Thr Glu
85 90 95

Arg Lys Val Thr Ile Met Tyr Ile Met Tyr Ile Pro Gly Leu Phe Ala
100 105 110
Leu Phe Leu Ala Gly Ile Ser Phe Gly Tyr Phe Val Leu Phe Pro Ile
115 120 125
Val Leu Ser Phe Leu Thr His Leu Ser Ser Gly His Phe Glu Thr Met
130 135 140
Phe Thr Ala Asp Arg Tyr Phe Arg Phe Met Val Asn Leu Ser Leu Pro
145 150 155 160
Phe Gly Phe Leu Phe Glu Met Pro Leu Val Val Met Phe Leu Thr Arg
165 170 175
Leu Gly Ile Leu Asn Pro Tyr Arg Leu Ala Lys Ala Arg Lys Leu Ser
180 185 190
Tyr Phe Leu Leu Ile Val Val Ser Ile Leu Ile Thr Pro Pro Asp Phe
195 200 205
Ile Ser Asp Phe Leu Val Met Ile Pro Leu Leu Val Leu Phe Glu Val
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Thr Ala Ala Ala Ala
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<213> Bacillus alcalophilus

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35 40 45
Ile Val Ala Leu Ile Gly Gly Phe Phe Leu Ala Val Pro Val Ile Thr
50 55 60
Phe Leu Gln Asn Ser Pro Gln Ala Ala Asp Met Pro Phe Asn Ala Phe
65 70 75 80

Arg	Leu	Thr	Asp	Pro	Leu	Arg	Val	Tyr	Met	Asn	Phe	Ala	Val	Ile	Thr
				85					90					95	
Ala	Leu	Val	Leu	Ile	Ile	Pro	Val	Ile	Leu	Tyr	Gln	Leu	Trp	Ala	Phe
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Val	Ser	Pro	Gly	Leu	Lys	Glu	Asn	Glu	Gln	Lys	Ala	Thr	Leu	Ala	Tyr
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Ile	Pro	Ile	Ala	Phe	Leu	Leu	Phe	Leu	Ala	Gly	Ile	Ala	Phe	Ser	Tyr
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Phe	Ile	Leu	Leu	Pro	Phe	Val	Ile	Ser	Phe	Met	Gly	Gln	Met	Ala	Asp
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Arg	Leu	Glu	Ile	Asn	Glu	Met	Tyr	Gly	Ile	Asn	Glu	Tyr	Phe	Ser	Phe
				165					170					175	
Leu	Phe	Gln	Leu	Thr	Ile	Pro	Phe	Gly	Leu	Leu	Phe	Gln	Leu	Pro	Val
			180					185					190		
Val	Val	Met	Phe	Leu	Thr	Arg	Leu	Gly	Val	Val	Thr	Pro	Thr	Phe	Leu
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Arg	Lys	Ile	Arg	Lys	Tyr	Ala	Tyr	Phe	Ala	Leu	Leu	Val	Ile	Ala	Gly
	210					215					220				
Ile	Ile	Thr	Pro	Pro	Glu	Leu	Thr	Ser	His	Leu	Phe	Val	Thr	Val	Pro
225					230					235					240
Met	Leu	Ile	Leu	Tyr	Glu	Ile	Ser	Ile	Thr	Ile	Ser	Ala	Ile	Thr	Tyr
				245					250					255	
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35

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<400> 13
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26

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cccaagctta aaaagaaaga agatcagtaa gttaggatg	39
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subtilis

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1 5

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subtilis

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1 5

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subtilis

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Arg Arg Thr His Val
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subtilis

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1 5

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subtilis

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subtilis

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 Arg Arg Asp Ile Leu
 1 5

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subtilis

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1				5					10					15	
Val	Ile	Gly	Ala	Val	Val	Tyr	Phe	Val	Lys	Ser	Asp	Tyr	Leu	Phe	Thr
			20					25					30		
Leu	Ile	Phe	Ile	Ala	Ile	Ala	Ile	Leu	Phe						
			35					40							

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subtilis

<400> 53

Met	Val	Ser	Ile	Arg	Arg	Ser	Phe	Glu	Ala	Tyr	Val	Asp	Asp	Met	Asn
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Ile	Ile	Thr	Val	Leu	Ile	Pro	Ala	Glu	Gln	Lys	Glu	Ile	Met		
			20					25					30		

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subtilis

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Met	Ala	Ala	Tyr	Ile	Ile	Arg	Arg	Thr	Leu	Met	Ser	Ile	Pro	Ile	Leu
1				5				10					15		
Leu	Gly	Ile	Thr	Ile	Leu	Ser	Phe	Val	Ile	Met	Lys	Ala	Ala	Pro	Gly
			20					25					30		

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subtilis

<400> 55

Met	Lys	Phe	Val	Lys	Arg	Arg	Ile	Ile	Ala	Leu	Val	Thr	Ile	Leu	Met
1				5					10					15	

Leu Ser Val Thr Ser Leu Phe Ala Leu Gln Pro Ser Ala Lys Ala Ala
 20 25 30
 Glu His

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 Phe Val Ile Val Thr Val Thr Phe Phe Leu Met Gln Ala Ala Pro Gly
 20 25 30

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<220>
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 Met Thr Ser Pro Thr Arg Arg Arg Thr Ala Lys Arg Arg Arg Arg Lys
 1 5 10 15
 Leu Asn Lys Arg Gly Lys Leu Leu Phe Gly Leu Leu Ala Val Met Val
 20 25 30
 Cys Ile Thr Ile Trp Asn Ala Leu His Arg
 35 40

<210> 58
 <211> 54
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 58
 Met Ala Tyr Asp Ser Arg Phe Asp Glu Trp Val Gln Lys Leu Lys Glu
 1 5 10 15
 Glu Ser Phe Gln Asn Asn Thr Phe Asp Arg Arg Lys Phe Ile Gln Gly
 20 25 30
 Ala Gly Lys Ile Ala Gly Leu Ser Leu Gly Leu Thr Ile Ala Gln Ser
 35 40 45
 Val Gly Ala Phe Glu Val
 50

<210> 59
 <211> 36

<212> PRT
<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 59

Met	Gly	Gly	Lys	His	Asp	Ile	Ser	Arg	Arg	Gln	Phe	Leu	Asn	Tyr	Thr
1				5				10					15		
Leu	Thr	Gly	Val	Gly	Gly	Phe	Met	Ala	Ala	Ser	Met	Leu	Met	Pro	Met
			20					25					30		
Val	Arg	Phe	Ala												
			35												

<210> 60

<211> 26

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 60

Met	Leu	Leu	Lys	Arg	Arg	Ile	Gly	Leu	Leu	Leu	Ser	Met	Val	Gly	Val
1				5				10						15	
Phe	Met	Leu	Leu	Ala	Gly	Cys	Ser	Ser	Val						
			20					25							

<210> 61

<211> 39

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 61

Met	Lys	Lys	Thr	Leu	Thr	Thr	Ile	Arg	Arg	Ser	Ser	Ile	Ala	Arg	Arg
1				5				10					15		
Leu	Ile	Ile	Ser	Phe	Leu	Leu	Ile	Leu	Ile	Val	Pro	Ile	Thr	Ala	Leu
			20					25					30		
Ser	Val	Ser	Ala	Tyr	Gln	Ser									
			35												

<210> 62

<211> 35

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 62

Met Lys Lys Arg Lys Arg Arg Asn Phe Lys Arg Phe Ile Ala Ala Phe
 1 5 10 15
 Leu Val Leu Ala Leu Met Ile Ser Leu Val Pro Ala Asp Val Leu Ala
 20 25 30
 Lys Ser Thr
 35

<210> 63
 <211> 33
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 63
 Lys Arg Arg Lys Phe Ser Ser Val Val Ala Ala Val Leu Ile Phe Ala
 1 5 10 15
 Leu Ile Phe Ser Leu Phe Ser Pro Gly Thr Lys Ala Ala Ala Ala Gly
 20 25 30
 Ala

<210> 64
 <211> 35
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 64
 Met Glu Met Phe Asp Leu Glu Phe Met Arg Arg Ala Phe Leu Ala Gly
 1 5 10 15
 Gly Met Ile Ala Val Met Ala Pro Ile Leu Gly Val Tyr Leu Val Leu
 20 25 30
 Arg Arg Gln
 35

<210> 65
 <211> 26
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 65
 Met Lys Lys Arg Arg Lys Ile Cys Tyr Cys Asn Thr Ala Leu Leu Leu
 1 5 10 15
 Met Ile Leu Leu Ala Gly Cys Thr Asp Ser
 20 25

<210> 66
 <211> 20

<212> PRT
<213> Artificial Sequence

<220>
<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 66
Met Arg Arg Ile Leu Ser Ile Leu Val Phe Ala Ile Met Leu Ala Gly
1 5 10 15
Cys Ser Ser Asn
20

<210> 67
<211> 43
<212> PRT
<213> Artificial Sequence

<220>
<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 67
Met Ser Ala Gly Lys Ser Tyr Arg Lys Lys Met Lys Gln Arg Arg Met
1 5 10 15
Asn Met Lys Ile Ser Lys Tyr Ala Leu Gly Ile Leu Met Leu Ser Leu
20 25 30
Val Phe Val Leu Ser Ala Cys Gly Asn Asn Asn
35 40

<210> 68
<211> 42
<212> PRT
<213> Artificial Sequence

<220>
<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 68
Lys Lys Arg Val Ala Gly Trp Tyr Arg Arg Met Lys Ile Lys Asp Lys
1 5 10 15
Leu Phe Val Phe Leu Ser Leu Ile Met Ala Val Ser Phe Leu Phe Val
20 25 30
Tyr Ser Gly Val Gln Tyr Ala Phe His Val
35 40

<210> 69
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> predicted twin-arginine signal peptides of B.
subtilis

<400> 69

Met Arg Arg Ser Cys Leu Met Ile Arg Arg Arg Lys Arg Met Phe Thr
1 5 10 15
Ala Val Thr Leu Leu Val Leu Leu Val Met Gly Thr Ser Val Cys Pro
20 25 30
Val Lys Ala Glu Gly Ala
35

<210> 70

<211> 38

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of *B. subtilis*

<400> 70

Met Arg Ile Gln Lys Arg Arg Thr His Val Glu Asn Ile Leu Arg Ile
1 5 10 15
Leu Leu Pro Pro Ile Met Ile Leu Ser Leu Ile Leu Pro Thr Pro Pro
20 25 30
Ile His Ala Glu Glu Ser
35

<210> 71

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of *B. subtilis*

<400> 71

Met Leu Arg Asp Leu Gly Arg Arg Val Val Ala Ile Ala Ala Ile Leu
1 5 10 15
Ser Gly Ile Ile Leu Gly Gly Met Ser Ile Ser Leu Ala Asn Met Pro
20 25 30

<210> 72

<211> 34

<212> PRT

<213> Artificial Sequence

<220>

<223> predicted twin-arginine signal peptides of *B. subtilis*

<400> 72

Met Lys Lys Met Ser Arg Arg Gln Phe Leu Lys Gly Met Phe Gly Ala
1 5 10 15
Leu Ala Ala Gly Ala Leu Thr Ala Gly Gly Gly Tyr Gly Tyr Ala Arg
20 25 30
Tyr Leu

<210> 73
 <211> 28
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

 <400> 73
 Met Arg Arg Phe Leu Leu Asn Val Ile Leu Val Leu Ala Ile Val Leu
 1 5 10 15
 Phe Leu Arg Tyr Val His Tyr Ser Leu Glu Pro Glu
 20 25

 <210> 74
 <211> 29
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

 <400> 74
 Met Phe Glu Ser Glu Ala Glu Leu Arg Arg Ile Arg Ile Ala Leu Val
 1 5 10 15
 Trp Ile Ala Val Phe Leu Leu Phe Gly Ala Cys Gly Asn
 20 25

 <210> 75
 <211> 37
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

 <400> 75
 Met Gln Lys Tyr Arg Arg Arg Asn Thr Val Ala Phe Thr Val Leu Ala
 1 5 10 15
 Tyr Phe Thr Phe Phe Ala Gly Val Phe Leu Phe Ser Ile Gly Leu Tyr
 20 25 30
 Asn Ala Asp Asn Leu
 35

 <210> 76
 <211> 34
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

 <400> 76

Met Met Leu Asn Met Ile Arg Arg Leu Leu Met Thr Cys Leu Phe Leu
 1 5 10 15
 Leu Ala Phe Gly Thr Thr Phe Leu Ser Val Ser Gly Ile Glu Ala Lys
 20 25 30
 Asp Leu

<210> 77
 <211> 44
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 77
 Met Ala Glu Arg Val Arg Val Arg Val Arg Lys Lys Lys Lys Ser Lys
 1 5 10 15
 Arg Arg Lys Ile Leu Lys Arg Ile Met Leu Leu Phe Ala Leu Ala Leu
 20 25 30
 Leu Val Val Val Gly Leu Gly Gly Tyr Lys Leu Tyr
 35 40

<210> 78
 <211> 47
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 78
 Met Ser Asp Glu Gln Lys Lys Pro Glu Gln Ile His Arg Arg Asp Ile
 1 5 10 15
 Leu Lys Trp Gly Ala Met Ala Gly Ala Ala Val Ala Ile Gly Ala Ser
 20 25 30
 Gly Leu Gly Gly Leu Ala Pro Leu Val Gln Thr Ala Ala Lys Pro
 35 40 45

<210> 79
 <211> 54
 <212> PRT
 <213> Bacillus subtilis

<400> 79
 Met Ala Tyr Asp Ser Arg Phe Asp Glu Trp Val Gln Lys Leu Lys Glu
 1 5 10 15
 Glu Ser Phe Gln Asn Asn Arg Phe Asp Arg Arg Lys Phe Ile Gln Gly
 20 25 30
 Ala Gly Lys Ile Ala Gly Leu Ser Leu Gly Leu Thr Ile Ala Gln Ser
 35 40 45
 Val Gly Ala Phe Glu Val
 50

<210> 80
 <211> 65

<212> PRT

<213> Streptomyces coelicolor

<400> 80

```
Met Thr Pro Ala Asn His Gln Ala Pro Thr Ser Ala Pro Ser Pro Ala
 1          5          10          15
Pro Ser Gln Ser Ser His Ala Pro Glu Leu Arg Ala Ala Ala Arg Ser
      20          25          30
Leu Gly Arg Arg Arg Phe Leu Thr Val Thr Gly Ala Ala Ala Leu
      35          40          45
Ala Phe Ala Val Asn Leu Pro Ala Ala Gly Thr Ala Ser Ala Ala Glu
      50          55          60
Leu
65
```

<210> 81

<211> 60

<212> PRT

<213> Streptomyces coelicolor

<400> 81

```
Met Ala Pro Thr Gly Arg Pro Ser Ala Leu Ala Glu His Ala Phe Ser
 1          5          10          15
Pro His Asp Ala Val Leu Gly Ala Ala Ala Arg His Leu Gly Arg Arg
      20          25          30
Arg Phe Leu Thr Val Thr Ala Ala Ala Ala Leu Ala Phe Ser Thr
      35          40          45
Asn Leu Pro Ala Arg Gly Ala Val Ala Ala Pro Glu
      50          55          60
```

<210> 82

<211> 47

<212> PRT

<213> Streptomyces coelicolor

<400> 82

```
Met Thr Ser Arg His Arg Ala Ser Glu Asn Ser Arg Thr Pro Ser Arg
 1          5          10          15
Arg Thr Val Val Lys Ala Ala Ala Ala Gly Ala Val Leu Ala Ala Pro
      20          25          30
Leu Ala Ala Ala Leu Pro Ala Gly Ala Ala Asp Ala Ala Pro Ala
      35          40          45
```

<210> 83

<211> 53

<212> PRT

<213> Streptomyces tendae

<400> 83

```
Met Thr Pro Ala Ala Arg Pro Ser Gln His Ala Pro Glu Leu Arg Ala
 1          5          10          15
Ala Ala Arg His Leu Gly Arg Arg Arg Phe Leu Thr Val Thr Gly Ala
      20          25          30
Ala Ala Ala Leu Ala Phe Ala Val Asn Leu Pro Ala Ala Gly Thr Ala
      35          40          45
Ala Ala Ala Glu Leu
      50
```

<210> 84
 <211> 43
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 84
 Met Ser Pro Ala Gln Arg Arg Ile Leu Leu Tyr Ile Leu Ser Phe Ile
 1 5 10 15
 Phe Val Ile Gly Ala Val Val Tyr Phe Val Lys Ser Asp Tyr Leu Phe
 20 25 30
 Thr Leu Ile Phe Ile Ala Ile Ala Ile Leu Phe
 35 40

<210> 85
 <211> 34
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 85
 Met Lys Arg Arg Lys Phe Ser Ser Val Val Ala Ala Val Leu Ile Phe
 1 5 10 15
 Ala Leu Ile Phe Ser Leu Phe Ser Pro Gly Thr Lys Ala Ala Ala Ala
 20 25 30
 Gly Ala

<210> 86
 <211> 43
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> predicted twin-arginine signal peptides of B.
 subtilis

<400> 86
 Met Lys Lys Arg Val Ala Gly Trp Tyr Arg Arg Met Lys Ile Lys Asp
 1 5 10 15
 Lys Leu Phe Val Phe Leu Ser Leu Ile Met Ala Val Ser Phe Leu Phe
 20 25 30
 Val Tyr Ser Gly Val Gln Tyr Ala Phe His Val
 35 40